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Environmental management and auditing systems

The reality of environmental self-regulation

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Abstract *This paper surveys the evidence that environmental auditing systems (EMSs), and the standard setting bodies represented by ISO 14001 and EMAS, have failed to meet their objectives on two counts. First, the standards will not lead to sustainability and second, they will not be any more economically efficient than the command and control approach. We begin by offering an historical overview of environmental standards and argue that the original intentions to link the environmental management standards with sustainability was abandoned during discussions. The opposing viewpoints about ISO 14001 and EMAS as market driven standards are discussed and then the degree of market penetration of the standards is examined. The costs of implementing an EMS are discussed in the context of the Swiss experience, and the costs to SMEs of EMSs outlined. Practical difficulties associated with the standards are considered, and the question asked, "Do EMSs lead to environmental improvement?"*

Introduction: a brief history of environmental standards

A recent development in Europe and North America, environmental law emerged and evolved rapidly in the last third of the 20th century. By the mid-1990s, highly complex regulatory frameworks existed in many countries. In Germany, for example there were approximately 800 environmental laws, 2,800 ordinances and 4,700 technical instructions. If state (*länder*) laws are taken into account, the total number of domestic environmental regulations may be as high as 35,000 (Wurzel *et al.*, 2003b, p. 117, 120).

Most environmental regulation is "command and control". Regulatory agencies may specify goals to be achieved and how this must be done. Polluting activities are managed, for example, by means of performance standards and technology based controls. Performance standards are generally enforced by means of permits/licenses. Technology based controls may be specific (e.g. a requirement to use catalytic converters) or general (e.g. a requirement to use "best available technologies"). The violation of regulations may lead to civil penalties and/or criminal prosecutions (Orts, 1995, p. 1235; Wolf and Stanley, 2003, pp. 5-11).

Several criticisms have been made of command and control approaches to environmental protection. It is often argued that market based instruments (MBIs) are economically more effective and efficient than more traditional forms of regulation. Command and control strategies can be difficult to implement. They rely on enforcement agencies which may be reluctant to use the powers they possess (Watson, 2003; Wolf and Stanley, 2003, pp. 47-54). They also depend on the existence of reasonably comprehensible bodies of environmental law. Some critics refer to the rapid growth of this area of law as "environmental juridification" (i.e. the proliferation of environmental law). Others refer ironically to "legal pollution" (Orts, 1995, p. 1237)[1].

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Dissatisfaction with environmental regulation led to the introduction of a range of new environmental policy instruments (NEPIs). These include market-based instruments such as eco-taxes, voluntary agreements between industry and public authorities, and "informational devices" such as eco-labels and environmental auditing schemes (Jordan *et al.*, 2003, p. 3). The rise of environmental auditing is not, therefore, an isolated phenomenon.

Environmental auditing began in North America in the 1980s (Watson and Emery, n.d.). At first, industries and individual businesses created systems that suited their own needs. By the early 1990s there was growing support for the establishment of internationally recognised auditing procedures. In 1993, the European Community adopted its Eco-Management and Audit Regulation (1836/93/EC). An international system – ISO 14001 – was created by the International Standardisation Organisation (ISO) (2003) 2 years later.

These systems – like other NEPIs – were generally welcomed.

> Beginning with the mid-1990s, ISO 14001 and EMAS (the European Union's Eco-Management and Audit Scheme) became very much in vogue as the tool for demonstrating environmental responsibility in the global marketplace. Consultants jumped on ISO and EMAS as the next opportunity in a mature market no longer driven by regulatory dynamics (MacLean, 2004, p. 13).

There was a general belief that the approach would lead to environmental self-regulation by business organizations, and lighten the heavy hand of government that controlled by regulation. As a result, both the European and the international standard were met with some enthusiasm. Whether this initial enthusiasm was justified is the subject of this paper.

Environmental management systems and sustainability

From the start, those developing the standards were driven by more than the desire to relax the heavy hand of the state. Most organizations were acutely aware of the need to deal with the tougher environmental controls that Europe and the US were putting in place. There was also the issue of sustainable development to consider. Environmental management systems were greatly encouraged by the Brundtland Commission Report, *Our Common Future* (World Commission on Environmental Development, 1987). EMSs were to be the corporate sector's response to Brundtland. It was clear that pollution and sustainable development were key issues for environmental accounting. The Brundtland Report stressed the need to address them at national and international levels. For businesses it meant that they could no longer treat environmental costs as an externality; they would be required to internalise these costs (Emery, 2002). If an EMS was to be successful then it would "... have a method of accounting for the full environmental costs, and these should be integrated into capital budgeting, cost allocation and other decisions" (Fortes, 2003, p. 80). This has serious cost implications for companies. If the environment – what Bob Gray has called natural capital – is seen as an externality then it is a free good as far as a business is concerned, and as free good will be consumed to the point where its marginal utility is zero (Gray and Bebbington, 2001).

The hopes for ISO 14001 and EMAS centred on them leading to firms achieving sustainability. These hopes would be realised only if the standards led to environmental improvement through firms measuring the amount of environmental

damage incurred and then seeking to reduce this amount in the future. In other words, the standards need to focus on *performance*. We have mentioned in this paper and elsewhere that whilst this may have been the initial aim of the standard setters, these original aims were watered down and the standards came to focus only on *conformance*.

ISO, a market driven standard?

The view is prevalent that in future ISO 14001 will be a requirement for entering the market place, and that market forces will ensure its implementation through the supply chain. But there are dissenting voices, and it has been argued that the pressures for implementation are not as direct as in the case of ISO 9000 because "... no immediate impact on product quality or usability is associated with better environmental management" (Roht-Arriaza, 2002, p. 264).

This market imperative perspective has led to the view that ISO 14001 may pose a threat to the economies of developing nations, not least because the standard is now part of the World Trade Organisation's trading agreements, and as an international standard it cannot be deemed a non-tariff barrier and a constraint to trade, but developing nations fear that this might be the effect. An international standard is, like the law and the Ritz Hotel, open to everyone. Developing nations will experience real economic costs if ISO 14001 becomes a standard in the same form as ISO 9000. Effectively it becomes a barrier to free trade[2]. There are those who argue that there is not much evidence to support this view because the pressures to implement ISO 14001 are unlike those for ISO 9000, and as a result such concerns are unjustified (Krut and Gleckman, 1998). This may be wishful thinking. Once large companies begin to ask for certification as a prerequisite of doing business, and government procurement agencies follow suit then previous evidence to the contrary will be redundant.

This will mean that developing nations will be forced to play the standards game if they wish to trade with the developed ones and then face the heavy expenditure associated with implementing ISO 14001, a standard they had little involvement in drafting. Being a member of the ISO club is expensive and most developing nations whilst invited to the meetings that were involved in drafting the standard were unable to attend because of the high costs of attendance. As a result, it is pertinent to ask whether a standard produced under such circumstances can be regarded as truly international.

Market penetration

Environmental auditing systems (EMSs) are unevenly distributed (Table I). In December 2002, 83.04 per cent the world's ISO 14001 certifications were concentrated in Europe and the Far East. Only 5.61 per cent were in Africa, West Asia, Central and South America. Many developing countries did not have any certifications.

There are also marked differences within continents. The European Union has 25 member states (Table II). In December 2002, Sweden had 2,730 ISO 14001 certifications (i.e. 307 per million inhabitants). Greece had 72 certifications (i.e. 6.8 per million inhabitants). European states, which are not EU members, tend to have low certification rates. In December 2002, Belarus, Bosnia and Macedonia had one each.

The distribution of EMAS registrations is also very uneven (Table III). In May 2003, the EU had 15 member states. Austria had 310 registrations (i.e. 38.3 per million inhabitants). Portugal had five registrations (i.e. 0.49 per million inhabitants).

How is this significant? EMSs can be regarded as "club goods" (Kollman and Prakash, 2002; Watson and Emery, n.d.). Firms implementing such systems incur significant costs yet the potential benefits of "club membership" are difficult to calculate and vary between regions.

Continent/regions	Number of countries/ economies	ISO 14001 certifications (December 2002)	Share of world certifications (per cent of total)
Africa and West Asia	31	1,355	2.74
Australasia	2	1,563	3.16
Central and South America	21	1,418	2.87
Europe	44	23,316	47.14
Far East	17	17,757	35.90
North America	3	4,053	8.20

Source: ISO (2003)

Table I.
ISO 14001 certifications across the world

Country[a]	Population (millions)	Number of ISO 14001 certifications by December 2002
Germany	82.5	3,700
Spain	41.2	3,228
United Kingdom	58.9	2,917
Sweden	8.9	2,730
Italy	57.9	1,894
France	59.4	1,666
Denmark	5.4	1,088
Netherlands	16.1	1,073
Finland	5.2	750
Hungary	10.2	640
Poland	38.6	434
Czech Republic	10.2	318
Austria	8.1	301
Belgium	10.3	255
Ireland	3.9	170
Slovenia	2.0	149
Portugal	10.2	137
Greece	10.6	72
Slovakia	5.4	70
Estonia	1.4	47
Lithuania	3.5	33
Cyprus	0.76	21
Latvia	2.3	20
Luxembourg	0.44	17
Malta	0.40	3

Note: [a]Those in italics joined EU in May 2004
Source: ISO (2003) and World Bank (2003)

Table II.
ISO 14001 certifications in the European Union

EU member states	EMAS registrations by May 2003
Germany	2,414
Austria	310
Spain	289
Sweden	201
Italy	141
Denmark	127
United Kingdom	78
Finland	41
Netherlands	27
France	24
Belgium	20
Greece	9
Ireland	8
Portugal	5
Luxembourg	1

Source: ENDS (2003a, p. 21)

Table III.
EMAS registrations in the European Union

EMSs are designed to facilitate compliance with environmental regulations and to satisfy the wishes/requirements of customers and other stakeholders. The incentives to introduce such systems will therefore vary in accordance with national regulatory frameworks and stakeholder pressures.

"Environmental leader states" such as Germany and Austria have introduced a highly complex environmental regulations at national and state levels. These are enforced with some rigour (Malek, 2001; Wurzel *et al.*, 2003a, pp. 51-72, b, pp. 115-36). EMSs (and environmental management systems in general) help to ensure that businesses comply with these regulations (Kollman and Prakash, 2002; Watson and Emery, n.d.).

Countries which have less effective or stringent environmental regimes may provide firms with weaker incentives to introduce EMSs. Ireland is a good example (Flynn, 2003, pp. 138-9):

> Irish environmental regulation has generally been one of the weaker, less developed EU policy regimes … Indeed Ireland, which accounts for just 1 per cent of the total EU population, appears to account for 10 per cent of the complaints submitted to the Commission for non-implementation of EU environmental directives … It is hard, therefore, not to get the impression of a "thin" regulatory regime essentially overloaded and unable to focus on delivering key priorities in the environmental sectors, never mind fostering NEPIs!.

The situation is broadly similar in Greece, albeit for different reasons. Greece has a complex and centralised regulatory regime (Getimis and Giannakourou, 2001, pp. 289-94). Unfortunately, its effectiveness leaves much to be desired (Giannakourou, 2001, p. 335):

> Despite its formal, legalistic and mandatory features, environmental policy in Greece has been shown to be incapable of influencing social and economic activities and guiding changes in behaviour. In broad terms, the credibility of environmental policy in Greece has been undermined, which makes it difficult for it to function under the more complex demands of an environmental audit process.

In the UK, environmental law tends to be less complex than in high regulatory states such as Germany and Austria. In addition, regulatory bodies such as the Environment Agency for England and Wales have a strong preference for voluntary agreements and compliance strategies. They tend to regard prosecution as "as last resort". When environmental offenders are convicted, sentencing tends to be lenient (De Prez, 2000; Fineman, 2000; Watson, 2002, 2003). Although firms may adopt EMSs for a variety of reasons, the need to ensure compliance with environmental regulations is generally not a high priority.

EMSs may be adopted by firms if there is sufficient pressure from actual and potential stakeholders. In environmental leader states, customers and other stakeholders may respond positively to such schemes. In other countries, EMSs may not give consumers and producers adequate market signals. Hillary (1998, pp. 188-9) has described a survey of British managers:

> There was a sense of frustration amongst respondents that there was not a greater interest from the groups they were specifically seeking to reach with their environmental statements. An even greater frustration existed with the source of the majority of the requests they received, from students.

In essence, the economic case for adopting EMSs may depend on the existence of a "critical mass" of ISO certifications or EMAS registrants (Hillary, 1998, pp. 187-8).

But EMSs were already in existence before the attempt was made to standardize them. Leaving aside the issue of whether it is appropriate to attempt to standardize something less tangible than a screw size or photographic film speed (two examples of ISOs previous successes) the establishment of any EMS is costly even without the added burden of accreditation and certification.

Economic costs of EMS

The costs of an EMS vary according to whether an organization adopts an in-house approach or chooses to adopt the EMAS or ISO 14001, but a useful indication of the possible costs of establishing an EMS can be gleaned from an interesting recent study of Swiss firms.

The authors point out that such costs can be divided into: set-up costs, which include the internal costs of establishing documentation and procedures and seeking advice where required; certification costs; and annual operating costs.

Whilst the authors are keen to stress that the factual basis for their data is weak and that they are based on companies' rough estimates, they offer an indication of the costs of implementing an EMS. Their figures indicate that the average cost for the set-up and operation of EMS in a Swiss company is 287,000 Swiss francs, or $220,769 (March 2004 conversion rate). There are differences according to size of firm. For a small business (1-49 employees) the cost is $71, 538 whilst for a medium company (50-249 employees) it is $118,462. Whilst for large companies (250 or more employees) the cost is much higher at $411,538, the relative cost is lower. For example the cost per employee ranges from $4,154 in small companies to $385 in large companies (Hamschmidt and Dyllick, 2001).

The average estimated financial benefit from the expenditure is $128,462. This ranges from $16,923 in the case of a small company and $263,846 in the case of a large one. Payback ranges from about 2 years or less for large and medium sized

firms, but based on their admittedly unreliable data, as much as 11 years for small firms. The authors do not state whether these figures allow for the time value of money. If the figures were subjected to an appropriate rate of discount then the discounted payback period would be longer.

The authors' reservations regarding the information they received seems to be based on the view that companies rarely measure the benefits or costs of their EMS. Why? The authors do not answer this question, but it may be the difficulty of identifying costs which can be lost in the overhead costs of the company. Also, the financial and technical documentation may not be sufficiently sophisticated to enable the identification and extraction of the necessary data (Freimann and Walther, 2001, p. 99). Some accountants have suggested that the adoption of an activity based costing system may make the tracking of environmental expenditures easier (Kreuze and Newell, 1994). This in turn may make it easier for organizations to focus on the costs they incur in operating an EMS. Of course, there may be another reason for the failure to measure the costs and benefits. If an EMS is to be effective and efficient then it clearly needs to become so tightly integrated with the management control systems that it becomes indistinguishable as a separate entity.

But whilst the financial benefits may be difficult to identify there are additionally non-monetary economic benefits. These include the reorganization of environmental activities within the organization and their incorporation of systems to increase the monitoring efficiency. In the Swiss research 76 per cent of companies saw felt this was of high value to them. Other economic benefits judged to be important were complying with the law, risk minimization, cost reduction, employee motivation, corporate image, and improved relationships with public authorities (Hamschmidt and Dyllick, 2001, pp. 50-1).

Costs of EMS to SMEs

Further evidence on the cost of EMSs comes from a Mexican study targeting small to medium sized enterprises (SMEs). It argues that as Mexican citizens are becoming increasingly environmentally aware they will not tolerate further environmental degradation. In Mexico SMEs are a major source of such pollution, but the costs of acquiring a certified environmental management system such as ISO 14001 is beyond their reach. In order for Mexican SMEs to take advantage of ISO 14001 there is a need for low cost certification. Mexican SMEs are facing the requirement to hold an ISO 14001 if they wish to deal with some large international companies. But, they will also need to see an economic rate of return beyond this requirement if they are to be persuaded to invest. The advantages to the environment in this case are tangible. The study found that in the case of the Mexican SMEs there were real environmental improvements when an EMS was adopted (Wells and Galbraith, 1999).

The difficulties in relation to cost for SMEs in implementing an EMS are noted elsewhere in the context of EMAS. An Italian study found that financial barriers were not the main obstacle to SMEs registering for EMAS. The main problem appeared to be the complexity of these systems. Nevertheless, the research notes that some of the difficulties encountered with EMAS could be surmounted if SMEs co-operated (Biondi *et al.*, 2000). Co-operation resulted in the use of joint auditing teams and the application of common solutions to problems. This approach reduced costs. The perspective that

EMAS developed in the SMEs, with its emphasis on reducing waste, resulted in further co-operation. This yielded external economies of scale. For example, neighbouring SMEs in the same industrial sector, ceramic tiles, were able to share equipment used to recycle broken tiles.

Practical difficulties

ISO 14001 is essentially a formal *conformance* standard, i.e. it is concerned with whether an organisation's management procedures are consistent with its environmental policy. It is not concerned with *performance* issues such as whether such systems actually protect the environment (*Environmental Manager*, 1996, p. 14). The emphasis is therefore on operational issues – not strategic ones. The authors of the Swiss study of ISO 14001 state: "Audits can be a powerful tool for achieving effective improvements. However, in practice, an over-emphasis on compliance and conformance to standard requirements often does not support the intended improvement process" (Hamschmidt and Dyllick, 2001, p. 52; see also Freimann and Walther, 2001, p. 95). Although conformance standards are not without value (as we argue elsewhere in this paper), they are apt to lead to "paper-chases" and "box-ticking" exercises. According to MacLean (2004, p. 13)

> Proceduralising any business activity tends to minimise strategic thinking. In many respects, ISO 14001 and EMAS illustrate one of the worst trends in environmental management. They may create the illusion to executive management that all is well because the process is in place; management's attention may shift from improving performance goals to completing a procedure and getting the box checked. Essentially, environmental concerns are reduced to a binary question, "Are we certified or not?"

The formal requirements of environmental management and auditing systems may be simultaneously too complicated and too vague. This can cause serious problems for SMEs. The situation is described by Biondi *et al.* (2000, p. 59)

> Both EMAS and ISO 14001 were intended to provide guidelines for correct implementation of an EMS to a wide range of enterprises, including very complex and large sites and organisations. This is why the requirements tend to be as exhaustive as possible, sometimes making them too detailed and complex for SMEs. On the other hand, because they must be applicable to any kind of enterprise, neither EMAS nor ISO 14001 could have been tailored to suit the needs of all types of organisations, and thus, despite the detailed approach, they still leave room for a flexible interpretation. So companies may still encounter a lack of clarity on what is exactly required for an effective EMS in certain specific situations...

Many SMEs lack the internal expertise (including management expertise) to establish environmental policies and effective management and auditing systems. Likely difficulties may not be fully appreciated (Hillary, 1998, p. 190)

> The complexity of issues and stakeholders associated with an organisation's environmental impact is frequently underestimated by management. This can lead to responsibility for the implementation of an organisation's EMS being given to a quality or health and safety manager with little or no experience of environmental issues.

These problems are particularly acute in developing countries (Krut and Gleckman, 1998, p. 89).

A crisis of confidence?

In order to be successful, externally validated management and auditing systems need to be credible, i.e. they must command the respect of stakeholders. Without this credibility, their value is very limited. A market-based instrument must give appropriate market signals.

Although many SMEs lack the expertise to operate EMSs systems effectively, the number of externally validated systems continues to rise. In December 1997, there were 4,433 certified ISO 14001 systems. By December 2002, the world total had risen to 49,462 (ISO, 2003, p. 32).

There is growing evidence that many external verifiers are willing to approve EMSs without conducting effective investigations. A recent survey was conducted by Environmental Data Services and the United Kingdom's Institute of Environmental Management and Assessment. A respondent who works for a major certification body commented:

> A certified EMS is only as good as the company implementing it. If the top management just want a greenwash or a badge on the wall then there are certification bodies out there that will do that – i.e. give certification based on intent rather than actual evidence ... Pressure should be put on the UK Accreditation Service to name and shame the poor performing certification bodies rather than dragging us all down with them (Hamschmidt and Dyllick, 2001, p. 52; Hillary, 1998, pp. 189-90; ENDS, 2003a, pp. 20-3; ENDS, 2003b, p. 20).

According to Krut and Gleckman (1998, p. 60), "there is strong motivation to use certifiers who have the lowest standards or to discover those certifiers who might be most receptive to bribery". This seems to be a serious problem in developing countries. An official at a standard-setting institution said:

> Say we have a company that we ... feel should lose their certification. But the consequences would be bad for domestic foreign revenue. This will put political pressure on us to let them keep their certification. The same applies to a company that is an exporter, for example to the EU. There is strong political pressure for certification to be granted so that the export marker is maintained. This pressure is not documented anywhere, but it is the main issue we speak about (Krut and Gleckman, 1998, p. 74).

Any guilt or embarrassment felt in such circumstances may be at least partially offset by the widespread view that ISO 14001 is an unofficial barrier to trade with developed counties (Krut and Gleckman, 1998, p. 78; Roht-Arriaza, 2002, p. 262).

Do EMSs lead to environmental improvement?

It is easy to be cynical about this. Certainly there is a great deal of evidence that ISO 14001 with its less rigorous certification and external auditing leaves serious concerns about the reduction of the environmental impact where EMSs are implemented. Recent ENDs reports offer numerous examples of disenchantment with the certification approach. In Asia there is considerable disillusionment with environmental consultants and verifiers[3].

The quality of the data produced is a major source of uncertainty. In the year 1999, a questionnaire was sent to the environmental managers of every ISO 14001 certified company in Switzerland and 54 per cent responded (i.e. 158 questionnaires). The results are described by Hamschmidt and Dyllick (2001, p. 49):

> Some 60 per cent of the companies experienced at least "some decrease" in their material and energy flows in relation to turnover … Only 10 per cent, however, reported a "strong decrease", and 30 per cent either did not measure the changes or even experienced a worsening in efficiency … Some 50 per cent of the companies experienced at least "some decrease" [in material and energy flows], but only 10 per cent reported a "strong decrease"; 40 per cent did not know or even experienced an increase … Looking at products, the companies reported that only small decreases with regard to environmental impacts had occurred since EMS implementation … Fully 17 per cent did not know.

The authors correctly observe: "Not knowing at all has to be considered as being the worst answer of all, since EMSs above all should create knowledge and sensitivity, even before improvements in productivity occur"[4].

Still, there is no doubt that larger companies are taking environmental monitoring more seriously than is required by the international standard, and are monitoring and controlling the output from their organizations that has an environmental impact. Perhaps their successes will have an impact on future revisions of the ISO 14001 and EMAS, revisions that emphasize performance rather than conformance.

Nevertheless, from an economic viewpoint there are serious resource implications in this. If a large number of EMSs are largely ineffective in achieving environmental improvement, and in effect bulldogs with rubber teeth, then they are economically inefficient systems that not only do not help to cut down on environmental waste but actually create it by absorbing management time that could be better used elsewhere, increased expenditure on paper resources and other consumables, not to mention the ineffective impact of high salaried consultants with a predilection for ticking boxes.

One of the criticisms of the command and control approach is that it is a blunt instrument. Governments generally employ ambient, technology or performance based standards.

These standards are not allocatively efficient and are unlikely to be cost-effective. If the above criticisms of ISO 14001 and, by association, EMAS, are well founded then they too are likely to be as ineffective in achieving the sustainability objective as the government based instruments.

Conclusion

Although it is entirely reasonable to have doubts about specific managerial environmental and auditing systems, it seems clear that such systems have (and will continue to have) an important role to play in environmental protection[5].

The jury is clearly out on the success or failure of the creation and implementation of standards for environmental management systems. What is clear from the evidence is that the standards themselves will not lead to environmental improvement, because they are not designed to do so. That said, they may have a useful function in getting the managers to focus on the environmental impacts their organizations are making, and in the process of gaining certification actually produce some tangible reduction in pollution. It seems that for larger organizations that are already taking stewardship of the environment seriously the standards will offer little more than an additional marketing tool, albeit one that one will be required by the market to have, but which in truth leads to little benefit. What is clear is that the self-monitoring approach of the standards may not lead to a more economically effective monitoring system than the command and control approach. The difference between the two approaches is

something that economists might explore in the future. But the question must be asked, can society afford all the consultants that both ISO 14001 and EMAS have spawned?

Notes

1. See generally Ackerman and Stewart (1985) and Hussen (1999). For a moderate defence of command and control environmental regulation see Steinzor (1998).
2. Similar criticisms have been made of eco-labels (Staffin, 1996).
3. "There is a strong feeling that ISO 14001 is not only a market requirement, it is a market creation. Many companies in Asia complain that ISO is being driven by consultants seeking business … Not only has a market been created into which developing countries feel they have to buy; there may be limited organisational or environmental value to be derived from the standard. ISO 14001 will be a market, not an environmental, standard." (Krut and Gleckman, 1998, p. 76).
4. It should be noted that surveys of this kind raise serious methodological problems. It is reasonable to assume that the respondents tend to be the more environmentally aware companies (Hamschmidt and Dyllick, 2001, pp. 44-5). Environmental managers also have personal interests. They have strong incentives to show that their systems are reducing costs. According to Freimann and Walther (2001, p. 100): "To sum up, one can probably say that most companies do not know their own sustainability status, let alone what that term may imply. Any academic who tries to evaluate this status and compare it with other companies or with the average status in one sector or the whole economy is therefore in a very difficult position".
5. In 2002, the British Government published an important white paper (formal consultation document) titled *Modernising Company Law* (Cm. 5553). It seems that environmental considerations are at last to be integrated within British company law. If the proposals are enacted by Parliament, companies will have a duty to disclose relevant environmental information in their annual operating and financial reports (OFRs). A general duty will also be imposed on all directors to have regard to the likely environmental impacts of their actions (where material to the success of their companies). For a useful discussion, see Howell and Pontin (2003).

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